

CLAIMS

1. A light receiving or light emitting panel in which a plurality of particulate semiconductor elements that have a light-to-electricity transducing function or electricity-to-light transducing function are incorporated in a planar fashion, characterized in that

a light transmitting printed wiring sheet that is used to position, hold and electrically connect said plurality of semiconductor elements is provided, and

the printed wiring sheet comprises:

a plurality of retaining holes disposed in a form of a matrix having a plurality of rows and a plurality of columns, through which a plurality of semiconductor elements are passed, and which hold intermediate parts in a height direction of the semiconductor elements, and

printed wiring which is formed on a surface of the printed wiring sheet, and which electrically connects the plurality of semiconductor elements.

2. A light receiving or light emitting panel according to claim 1, wherein a transparent covering material is provided which covers in embedded form said printed wiring sheet and the plurality of semiconductor elements that are held on this printed wiring sheet.

3. A light receiving or light emitting panel according to claim 2, wherein said printed wiring sheet is constructed from a thin sheet material made of a transparent hard synthetic resin.

4. A light receiving or light emitting panel according to claim 2, wherein said covering material is constructed from a soft synthetic resin material, and the light receiving or light emitting panel is constructed with a structure deformable in the

manner of a two dimensional or three dimensional curved surface.

5. A light receiving or light emitting panel according to claim 2, wherein said covering material is constructed from a hard synthetic resin material, and the solar cell panel is constructed with a hard flat-plate structure.

6. A light receiving or light emitting panel according to claim 2, wherein said semiconductor elements each comprise a spherical element main body made of a p type or n type semiconductor, a pn junction, and a pair of electrodes that are formed on both end parts with the center of the element main body interposed, and that are connected to both ends of the pn junction, and said pair of electrodes are connected to the printed wiring of the printed wiring sheet.

7. A light receiving or light emitting panel according to claim 2, wherein said semiconductor elements each comprise a cylindrical element main body made of a p type or n type semiconductor, a pn junction, and a pair of electrodes that are formed on both end parts in an axial direction of the element main body, and that are connected to both ends of the pn junction, and said pair of electrodes are connected to the printed wiring of the printed wiring sheet.

8. A light receiving or light emitting panel according to claim 2, wherein a plurality of partially spherical lens parts are formed in positions corresponding to the plurality of semiconductor elements in surface parts of the covering material on a light receiving or light emitting side of said light receiving or light emitting panel.

9. A light receiving or light emitting panel according to claim 2, wherein a plurality of partially cylindrical lens parts are formed in positions corresponding to respective columns or respective rows of the plurality of semiconductor elements in surface parts of the covering material on a light receiving or light

emitting side of said light receiving or light emitting panel.

10. A light receiving or light emitting panel according to claim 2, wherein reflective films for reflecting light are formed in surface parts on an opposite side from a light receiving or light emitting side of said light receiving or light emitting panel.

11. A light receiving or light emitting panel according to claim 4, wherein there are provided with a printed wiring connected to an outer edge portions that contact at least a pair of electrodes of each semiconductor element among the outer edge portions of each retaining hole of said printed wiring sheet.

12. A light receiving or light emitting panel according to claim 4, wherein a pair of projecting pieces that correspond to at least a pair of electrodes of each semiconductor element, and that are bent so as to contact the pair of electrodes, are formed on an outer edge portions of the respective retaining holes of said printed wiring sheet.

13. A light receiving or light emitting panel according to claim 2, wherein both surfaces of said covering material are formed as parallel flat surfaces, and glass plates or glass sheets are disposed on these surfaces.

14. A light receiving or light emitting panel according to claim 2, wherein both surfaces of said covering material are formed as parallel flat surfaces, a glass plate or glass sheet is disposed on a flat surface on a light receiving or light emitting side, and a reflective film for reflecting light is disposed on a flat surface on an opposite side from said flat surface.

15. A method for manufacturing a light receiving or light emitting panel in which a plurality of particulate semiconductor elements that have a light-to-electricity transducing function or electricity-to-light transducing

function are incorporated in a planar fashion, this method being characterized by comprising:

a first step in which a plurality of semiconductor elements and a light-transmitting printed wiring sheet material are prepared;

a second step in which a printed wiring for connecting said plurality of semiconductor elements is formed on said printed wiring sheet material;

a third step in which a printed wiring sheet is manufactured by punching a plurality of retaining holes in said printed wiring sheet material in a form of a matrix that has a plurality of rows and a plurality of columns; and

a fourth step in which respective semiconductor elements are inserted into the plurality of retaining holes in said printed wiring sheet, to hold intermediate portions in a direction of height of these semiconductor elements, and a pair of electrodes on each semiconductor element are electrically connected to said printed wiring.

16. A light receiving or light emitting panel manufacturing method according to claim 15, wherein a pair of electrodes of each semiconductor element are electrically connected to said printed wiring by disposing pieces of metal with a low melting point in the vicinity of this pair of electrodes, and irradiating these metal pieces with a heating beam.